

# SB-2000 Series

## CURRENCY DISCRIMINATOR



## ***OPERATOR'S MANUAL***

(Revised 06/01/2011)

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# Table of Contents

<b>1. Introduction -----</b>	<b>3</b>
1-1 Introduction	3
1-2 FCC Compliance	3
<b>2. Important Safety Information -----</b>	<b>4</b>
2-1 Safety Precaution	4
2-2 Installation and Handling of the Machine	6
<b>3. Description of Parts and Control Panel -----</b>	<b>8</b>
3-1 Parts Description	8
3-2 Overview of LCD Display Screen	9
3-3 Overview of Control Panel	10
<b>4. Getting Started -----</b>	<b>13</b>
4-1 Setting Up	13
4-2 Initialization	13
4-3 Placing Bills into the Hopper	14
4-4 Connecting of External Devices	15
<b>5. Basic Operation and Modes -----</b>	<b>16</b>
5-1 Selecting Operation Modes	17
5-2 Selecting Batch Function	22
5-3 Selecting Add Function	23
5-4 Changing Display Contents	24
<b>6. Set Function and Parameters -----</b>	<b>25</b>
6-1 Main Function Menu	25
6-2 Engineering Setup	35
<b>7. How to Print Reports -----</b>	<b>36</b>
<b>8. How to Clear Counting Results -----</b>	<b>40</b>
<b>9. Troubleshooting -----</b>	<b>42</b>
<b>10. Daily Maintenance Cleaning -----</b>	<b>50</b>
<b>11. Product Specifications -----</b>	<b>55</b>

# **1. Introduction**

## **1-1 Introduction**

This guide covers the installation, maintenance, and troubleshooting of SB-2000 Series Currency Discriminating Counter. We recommend reading this guide thoroughly before operating the Currency Discriminator. Then, as you become more familiar with SB-2000, use it as a reference guide to look up information when you need it.

## **1-2 FCC Compliance**

**THIS DEVICE COMPLIES WITH PART 15 OF FCC RULES.  
OPERATION IS SUBJECT TO THE FOLLOWING CONDITIONS:**

1. THIS DEVICE MAY NOT CAUSE HARMFUL  
INTERFERENCE, AND
2. THIS DEVICE MUST ACCEPT ANY  
INTERFERENCE RECEIVED, INCLUDING  
INTERFERENCE THAT MAY CAUSE

### **FCC Notice**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates uses and can emit radio frequency energy and, if not installed and used in accordance with the instruction manual may cause harmful interference in radio communications. Operation of this equipment in a residence area is likely to cause harmful interference in which case the users will be required to correct the interference at their own expense.

## **2. Important Safety Information**

### **2-1 Safety Precaution**

Please read the safety precautions below before operating SB-2000. They must be observed to avoid any potential hazards that could result in personal injuries or damage to SB-2000 Currency Discriminator Counter.

#### **ELECTRICAL SAFETY!**

To avoid the risk of electrical shock, fire, or damage to SB-2000 Currency Counter

1. Do not remove machine covers or guards that require a tool for removal. There are no operator serviceable areas inside your machine. Contact your service personal for help.
2. Never defeats interlock switches. This machine is designed to restrict operator access to unsafe areas. Covers, guards and interlock switches are provided to ensure that the machine will not operate with covers opened.
3. Do not disassemble SB-2000 yourself.
4. Do not use damaged or worn power cords or plugs.
5. Keep metal objects, such as paper clips, away from the hopper and stacker. If an object does fall into the unit, turn off the power and unplug SB-2000 immediately. Contact an authorized SB-2000 service provider for assistance.
6. Keep liquids away from SB-2000. Do not operate the Currency Counter if it is wet. Also, do not touch the Currency Counter if you are wet. If a spill occurs, turn off the power and unplug SB-2000 immediately. Contact an authorized SB-2000 service provider for help.

#### **SAFETY INSTRUCTIONS!**

The SB-2000 Currency Counter automatically starts operating in certain circumstances. Consequently, it is important to always follow these precautions:

1. Do not wear loose clothing or jewelry while operating the Currency Counter.
2. Make sure that your hair does not touch the Currency Counter.
3. Do not touch currency that has been placed in the stacker while the motor is running.

4. Turn off the power before performing any maintenance or error corrections that require you to put your hands into the machine.
5. Do not allow anything to rest on the power cord, line cord, or PC interface cable.
6. Do not install your machine near walking area ensuring that power plug of the machine does not get unplugged during operation.
7. Use supplies or cleaning materials only as directed. Keep all supplies and cleaning materials out of the way of children.
8. Your machine and the supplies are designed and tested to meet strict safety requirements. Included are safety agency examination and approval and compliance to establish environmental standards.

### **Warning**

Hazardous moving parts!  
Keep fingers and other body parts away

### ***CAUTION***

- 
- Keep drinks, food, and other foreign objects away from the Currency Counter.
  - Placing foreign objects on or into the Currency Counter can interrupt operation of the machine.
-

## **2-2 Installation and Handling of the machine**

### **Unpacking**

After unpacking the SB-2000 Currency Discriminator Counter, store the box and packing materials for future shipping. Failure to ship the Currency Counter in the original box and packaging will void the warranty.

### **Installation**

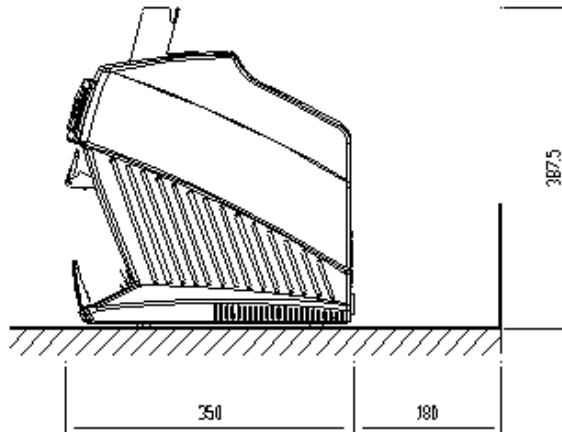
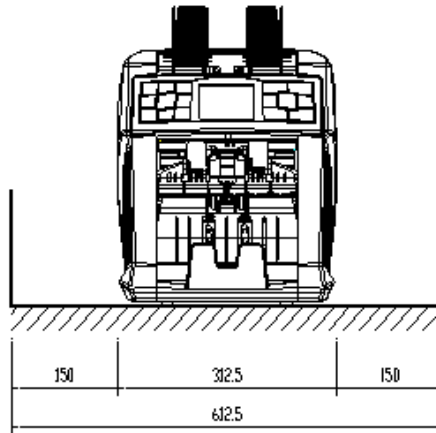
1. Select an appropriate workspace. Make sure that the work surface is flat and level, away from any heating device, such as a radiator, away from bright sunlight, and as free of dust, dirt, and smoke as possible. This will ensure proper operation and prevent damage to the rubber components of the machine.
2. Operate on only the following power sources: 120VAC/60Hz, (USA and North America).
3. Connect the power cord to the back of the Currency Counter.
4. Plug the cord into the wall outlet.
5. When replacing fuses, use only the same type and rating. Using a higher rated fuse can create a fire hazard.

Use the product in the following temperature and humidity range.

- a. Temperature 0-35° (32-95F)
- b. Humidity 20-90% (without dew condensation)

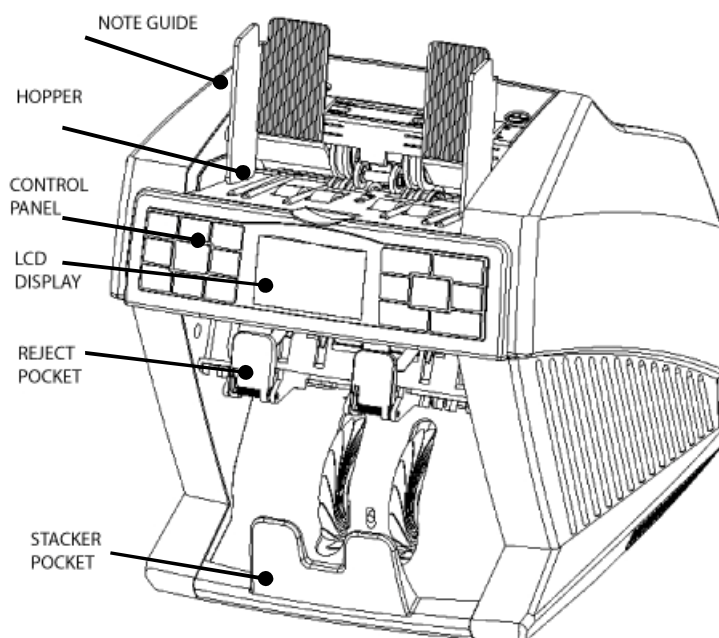
### ※ Installation Spacing Requirement ※

- Allow sufficient space from peripheral walls and the product as shown on the following Figure.
- Allow sufficient operation space for inserting and removal of banknotes, opening and closing of doors and covers and also allow space necessary for maintenance.

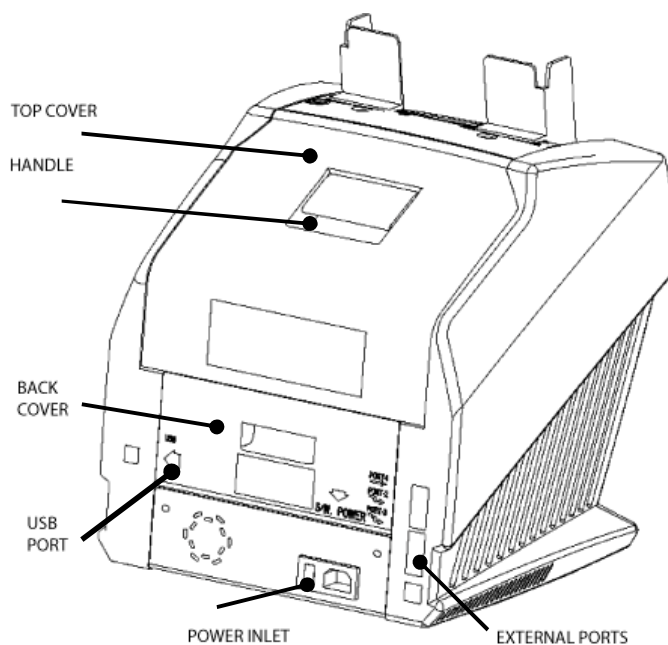


## 3. Description of Parts and Control Panel

### 3-1 Parts Description

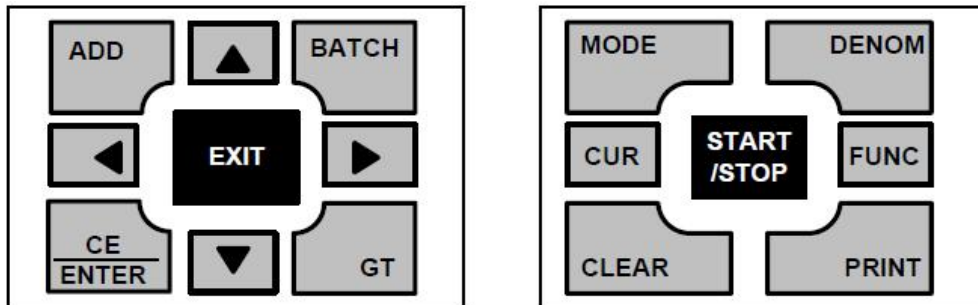


<FRONT VIEW>



<REAR VIEW>

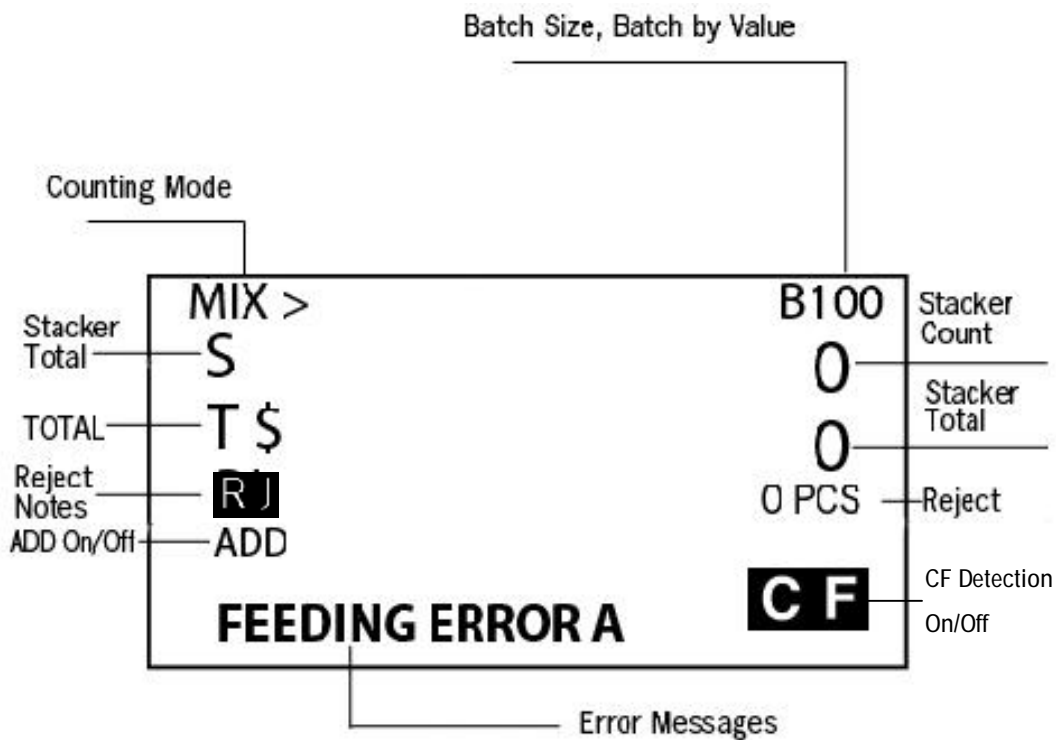
### 3-2 Overview of LCD Display screen



### LCD Display

The message description and placements are defined below.

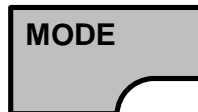
When a guide message shows up, the screen automatically changes to normal display from detail display.



<Main display screen>

### 3-3 Overview of Control Panel

#### 3-3-1 Mode - key



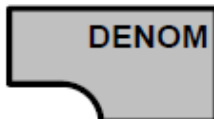
User can choose from MIX, SDC, DIR, SNP (Option), and CNT mode

**MIX à SDC à SORT à DIR à SNP à CNT**

When [MODE] key is pressed continuously, the mode changes to the next one.

- MIX: Mixture of denomination banknotes.
- SDC: Single denomination of banknotes.
- SORT: Separating denomination from an organized strap.
- DIR: Direction by facing, orientation and denomination.
- SNP: Serial Number printing function (Optional feature)
- Count: Non-Discriminating Piece count.

#### 3-3-2 DENOM – key



- User can select desire denomination in SDC and in DIR mode. [DENOM] key is also used to access to factory's default batch in MIX mode.

#### 3-3-3 Currency - key



- User can select the type of currency if multiple currencies are loaded from the factory.
- When [CUR] key is pressed, the currency changes to the next one. For example, USD → EURO → LOCAL (if multiple currencies are loaded to the SB-2000)

#### 3-3-4 Start/stop - key



- In counting (CNT) mode, machine stops or resume counting from an error condition.
- In SORT mode, machine resumes counting from an stop condition (Change of Denomination)

### 3-3-5 Function - key



§ [FUNC] key is used to enter into Main Menu function and it is protected by password to prevent unauthorized access to Main Menu settings.

### 3-3-6 Clear - key



§ [CLEAR] key is used to enter into CLEAR menu to clear current count, grand total and memory.

### 3-3-7 Print - key



§ [PRINT] key is used to enter into PRINT MENU function and user is able to print out different reports to an external Printer (If printer is connected).

### 3-3-8 Add - key



§ [ADD] Key control the accumulation in piece count mode (CNT) and also used to accumulate and carry over total in between different modes, such as MIX, SORT etc.

### 3-3-9 Up, Down - key



§ These Up-down direction keys are used to set up batch function (1-200) and increase or decrease batch number by 10 increment. Up-down Direction keys are also used to browse in between different menu items.

### 3-3-10 Left, Right - key

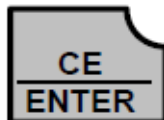


- § These left-right direction keys are used to set up batch function (1-200) and increase or decrease batch number by 1 increment. Right direction key [▶] is used to change into different screen during discriminating modes (MIX, SDC, and SORT etc).

### 3-3-11 Batch - key



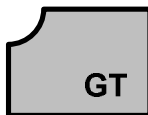
- § [BATCH] key is used to perform regular batch (1-200) count in piece count (CNT) mode.
- § [BATCH] key is also used to activate denomination batch function (DB).
- § In MIX mode, using of [BATCH] key function, user can enter into [BVAL] mode where user can count a batch by pre-selected amount.



### 3-3-12 CE/ENTER - key

- § [CE/ENTER] key is used to choose and select all setting options under Main menu, batch setting etc. EXIT Key is used to confirm all setting changes. **CE key is also used to clear current counting result on the screen. CE is an abbreviation of Clear + Enter.**

### 3-3-13 GT (Grand Total) - key



- § [GT] provides user with Grand total count on the screen.

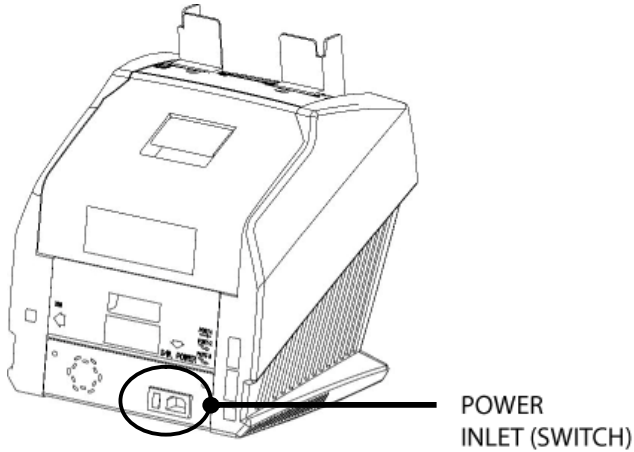
### 3-3-13 EXIT - key



- § [EXIT] key is used to confirm all setting changes and exit at the same time.
- § [EXIT] key allows user to escape from a set up screen or back to main menu screen if pressed twice.

## 4. Getting Started

### 4-1 Setting up

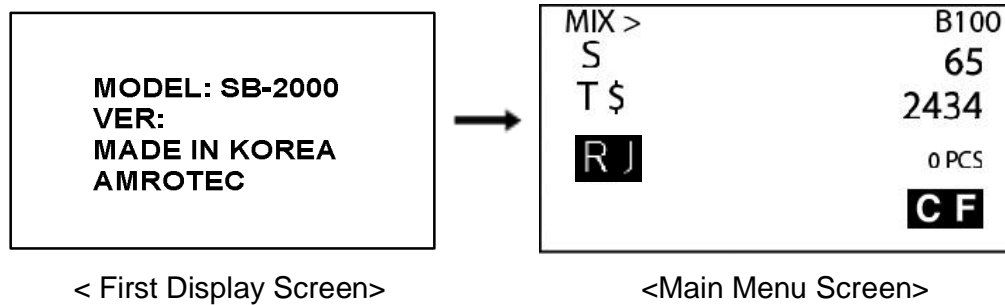


#### **Power Cord**

Plug one end of the cord into the back of the machine and the other end into a standard AC power outlet. If you turn on the power switch, the machine will display initializing process for a second and LCD display shows machine model and software version. If there is Service Call number saved by a service provider, the Call number will be displayed as below:

### 4-2 Initialization:

See below first display screen and follow-up main menu screen during the initialization process.

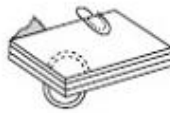


### 4-3 Placing bills into the hopper

- I Avoid counting of wet, excessively dirty or spoiled banknotes.



- I Prior placing banknotes on the banknote hopper, check for foreign matter (paper chips, rubber bands, clips, dust etc) mixed with banknotes and remove them.



- I Remove folded banknotes or straighten them prior placing them to Note hopper. Spread and separate brand new notes well due to slightly adhesive nature of banknotes in a new bundle.

- I Align all the four corners and edges of banknotes. Any unevenness may cause an error.

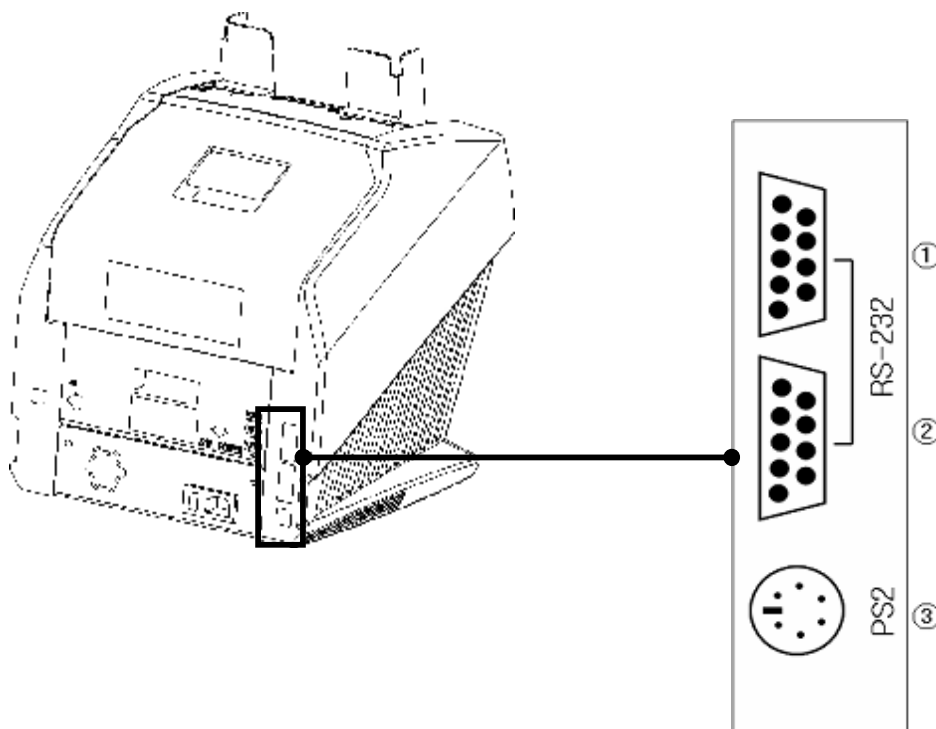


<Correct Placement>



<Incorrect placement>

## 4-4 Connecting of External Devices



<Back view>

### 1) Terminal Interface Connection (①, ②)

SB-2000 can be connected to a PC to upgrade software or transfer machine data (parameter) or control the machine vice-versa.

► **Connect an interface cable to ① and ②.**

### 2) Printer Interface Connection (②)

SB-2000 can print out counting results and machine parameters to an external printer (Optional) if connected.

► **Connect an interface cable to ②.**

### 3) Customer display Connection (③)

SB-2000 can display the result through a Customer Display unit (optional).

► **Please connect your customer display to 3.**

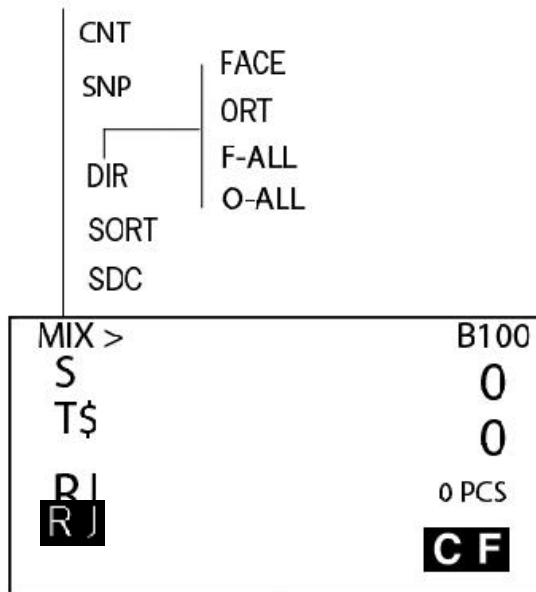
## 5. Basic Operation and Modes

Mode		Display Screen		Specification
MIX	Basic	MIX		Count mixture denomination of selected currency banknotes
	ADD	MIX	ADD	
	Value batch	MIX	BVAL	
SDC	Basic	SDC		Count the selected denomination of banknote and reject mismatch banknotes to reject pocket
	Denomination	SDC	Selected denomination	
	ADD	SDC	ADD	
DIR	UP-DOWN	FACE	FACE	Organizing single denomination or mixture banknotes by its face, direction and orientation.
	MIX - FACE	F-All	F-ALL	
	DIRECTION	ORT	ORT	
	MIX-ORT	O-ALL	O-ALL	
SORT		SORT	DD	Separation of organized Strap of banknotes
SNP (Optional)	Basic	SNP		Print serial number of banknotes
	ADD	SNP	ADD	
CNT	Basic	CNT		Counting Mode is for counting all currencies without detection
GT(Grand total)				

## 5.1 Selecting Operation Modes

There are four main counting modes; COUNT, MIX, SDC and SORT modes. Furthermore, the machine provides the facilities to align notes with same face (up and down face) or same directions (Orientation). For detail, please refer to the “DIR” mode described below. The modes are changed in sequence every time when the MODE key is pressed as shown below:

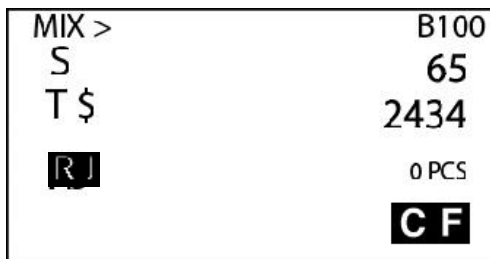
**MIX à SDC à SORT à DIR à SNP (option) à CNT**



### MIX mode (Mixture of denominations)

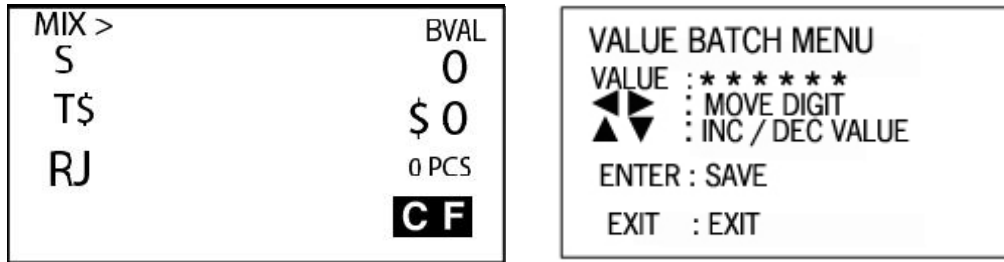
In Mix mode, the SB-2000 machine counts and discriminates mixture denominations of banknotes, such as mixture of \$1, \$5, \$10, \$ 20 etc. If the denomination of a banknote is successfully discriminated, then the banknote will be sent to the output stacker. If a note fails to be detected or it is a counterfeit suspect (if CF mode is ON), the banknote will be sent to the reject pocket.

To change into the MIX mode, press [MODE] key until “MIX” is displayed on LCD.



## MIX mode - BVAL

In Mix mode (BVAL, user can set a Dollar amount (Value) and batch mixture denomination of banknotes by amount. For example, user can set the Batch Value as \$300 and count mixture denomination of banknotes. SB-2000 will stop when total stacker amount reaches the Batch Value.



- § BVAL mode can be activated by pressing [DENOM] key; **[DENOM] à B200 à BVAL**
- § BVAL amount can be set by pressing [BATCH] key until [BVAL] is flashing followed by [CE/ENTER] key to enter into setting menu as shown above.
- § If BVAL mode is activated, 'Grand Total' clears automatically and user cannot use 'Grand Total save' function any longer.

How to set Batch Value (Dollar amount):

◀ ▶	Move between digits.
▲ ▼	Increase values / decrease values
CE/ENTER	Enter into setting values mode.
ADD	Clear setting values.
EXIT	Save setting values. After setting of the batch value, press [EXIT] key to exit.

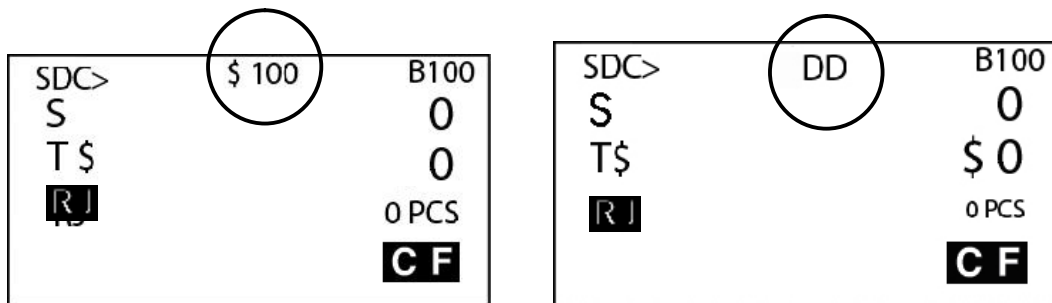
## SDC mode (Single Denomination Count)

In SDC mode, user can count single denomination of banknotes while separating other denomination of banknotes mixed within a strap. When SB-2000 reads a note whose denomination is the same as the first denomination of note counted or same as pre-set denomination, then it reads the banknote and sends the banknote to output stacker. If the banknote is not the same denomination, the machine then sends the banknote to Reject Pocket.

To change counting mode to SDC mode, press MODE key until “SDC” is displayed on LCD display screen as shown below. After changing the counting mode to SDC mode, user could select a denomination by pressing [DENOM] key or stay with DD (detected denomination). If a denomination is selected, the selected denomination will be displayed on the LCD screen as shown below. For example (US dollar), every time [DENOM] key is pressed, the denomination will be changed sequentially:

**DD à \$1 à \$2 à \$5 à \$10 à \$20 à \$50 à \$100**

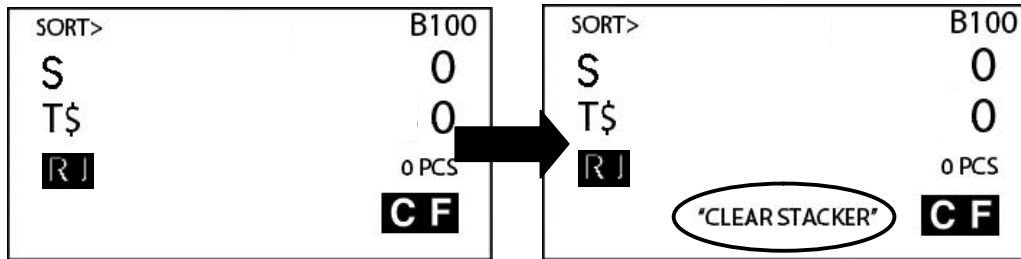
“DD” is an abbreviation of “Detected Denomination”. If “DD” is selected, SB-2000 detects the denominated first banknote as standard. SB-2000 then counts the banknotes of that denomination to output stacker and sends all other denominations banknotes to reject pocket. If the output stacker and the input Hopper are emptied, the machine will try to find a new denomination of the first note in next trial and sorts the banknotes with the new denomination.



### **SORT MODE (counting of organized strap)**

In SORT mode, SB-2000 allows you to count and sort stack of organized mixed denomination banknotes into straps and verify deposits. Each time machine begins processing of a new stack of banknotes; it automatically starts counting of the first note fed from the hopper. When a note of a different denomination from the first denomination is detected, machine stops and keep the new denomination banknotes within the transport path. User would then be asked to remove all notes from the stacker (“CLEAR STACKER”) and once that is done, machine resumes counting. Machine will send the new denomination of banknote to the stacker and continue the operation in this matter. ***This should be noted that during this SORT operation, there will be some banknotes rejected every time a new denomination is detected and machine stops. These rejects notes are not added to the total count and must be***

*counted manually by users.*



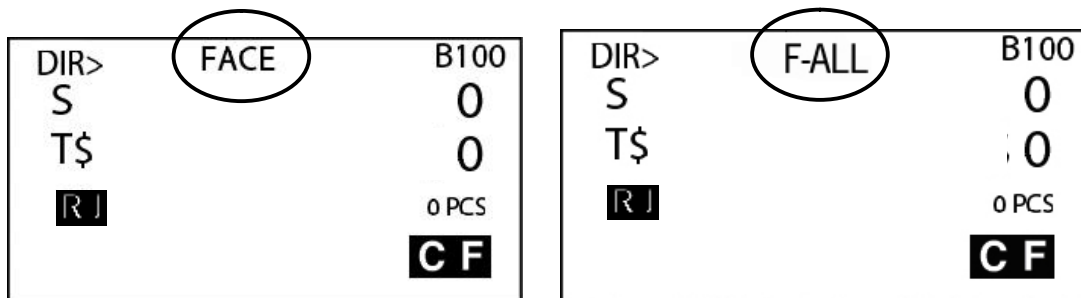
### **DIR MODE (Facing and Orientation of banknotes)**

DIR mode is divided into four separate sub-modes as below:

**DIR Mode à FACE à ORT à F-ALL à O-ALL**

#### **§ FACE and F-ALL:**

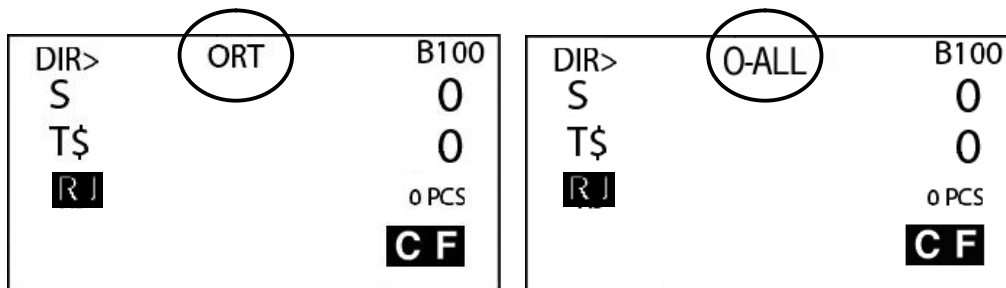
Facing means to arrange banknotes by its face. In this mode, the machine reads the first note to determine the face and denomination information. Then it transports the banknotes whose face and denomination are the same as the first banknote to the output stacker and all mismatch banknotes to the Reject Pocket. If user wishes to start counting a particular face and denomination first, then empty the output Stacker and the input Hopper and retry with the first note having preferred face and denomination. This Face mode also equipped with a “F-ALL” (Face-All) sub-mode where machine allows you to sort mixed banknotes by their face. The machine reads the first note to find out the face information despite of denomination.



### ■ **ORT and O-ALL mode (Orientation)**

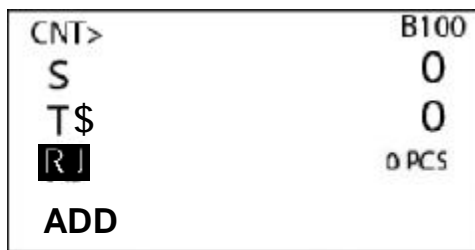
In this mode, the machine arranges the banknote with its direction, face and denomination. The machine reads the first note and determines the denomination, direction and face. Then it sorts the banknotes with the information. If a note has same denomination, face, and direction, then it transports the banknote to the output Stacker. Otherwise it sends to the Reject Pocket.

This Orientation mode also equipped with an “O-ALL” sub-mode where machine allows you to sort mixture of banknotes by its orientation. The machine reads the first note to find out the direction of face information despite of the denomination.



### **CNT MODE (Piece Counting mode)**

In counting mode, the machine only counts banknotes by pieces without discriminating a



denomination. To change into piece counting mode, press MODE key until “CNT” is displayed on LCD display screen. User can also accumulate multiple straps while in Count Mode.

### **<OPTIONAL FUNCTION>**

#### **SNP MODE (Serial number printing mode)**

In SNP mode, SB-2000 reads serial number of banknotes and print them as image on a factory configured thermal printer. To change to the SNP mode, press MODE key until “SNP” is displayed on LCD screen.



#### **GT (Grand total)**

Display screen shows detail of current count results and Grant Total (GT) by quantity and amount for each denomination of banknotes.

\$5 PCS	1100
SUM	5500
\$10 PCS	300
SUM	3000
\$20 PCS	20
SUM	400
\$50 PCS	10
SUM	500



## 5-2 Selecting Batch Function

### § Batching (1-200) and Preset Batch (200, 100, 50, 20, 10)

SB-2000 is equipped with a [BATCH] key to allow users to strap single or mixture denomination of banknotes. Batch is defaulted as 200 [B200] as it affects the maximum stacker capacity. To change default batch number (200) to variable batch between 1 -200 or pre-set batch value, please follow the steps below:

In Count (CNT) mode, continue to press [BATCH] KEY until it reached to your desire batch value. [BATCH] à B200 à B100 à B50 à B20 à B10.

In all other modes, to change the batch number value, first press [BATCH] key and when [B200] is blinking, press [ENTER] key. You can then continue to press [BATCH] key until your desire batch number is located (preset value 100, 50, 25, 20, 10) or use four direction keys [▲] [▼] [◀] [▶] to set any batch number from 1- 200. Once your batch number is set, press [EXIT] to escape to Main screen.

Up-down direction keys [▲] [▼] are used to change batch number with 10 increment and left-right direction keys [◀] [▶] are used to change batch number with 1 increment. Also, note that batch function cannot be turned off in any discriminating mode; however, it can be changed to [DB] denomination batching as described below.

### § Denomination Batch (DB) [applicable to SDC / SORT / FACE modes]

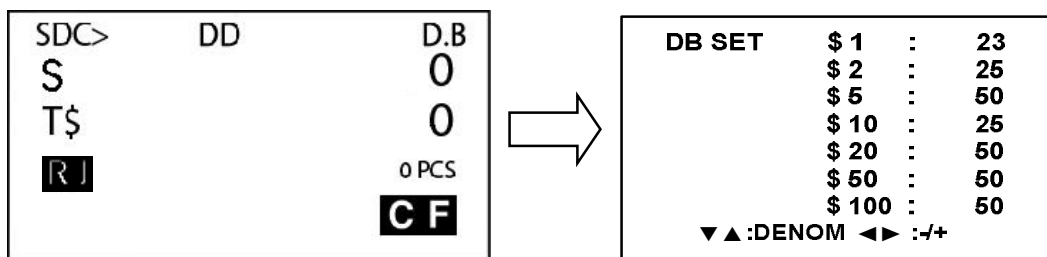
Each Denomination associated Batch function (DB) is available with 'SDC', 'SORT', and 'FACE' modes and can be activated or deactivated by pressing [BATCH] key. This is how they are organized:



Once Batch Key is pressed, "DB" message is displayed on LCD screen ensuring activation of the denomination batch function. If DB is selected, machine will count and batch the desired denomination by pre-set batch number. For further information on how to set up DB (Denomination Batch) setting, please see below:

### DB (Denomination Batch) setting:

In order to set batch number for each denomination, activate [DB] function by pressing [BATCH] key and then, enter into [DB] setting by pressing [CE / ENTER] key. User can set desired batch number for each denomination using four direction keys [▲] [▼] [◀] [▶].



[▲] [▼]: Select Denomination

[◀] [▶]: Set Batch number (press 1 time to change (+) (-) with 1 increment  
Keep on pressing; or hold down to change the number rapidly.

After denomination batch setting is completed and confirmed, press [EXIT] key to escape.

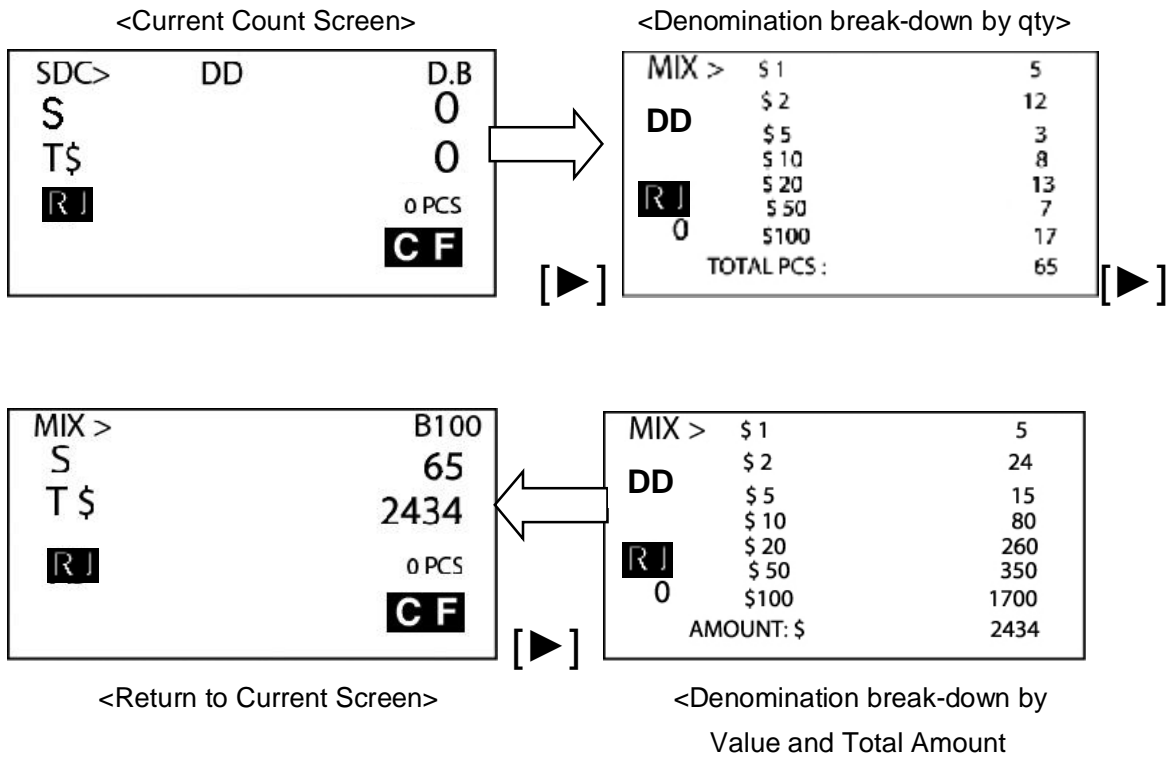
## 5-3 Selecting Add Function

### ■ ADD Function in all modes (CTN, MIX, SDC, FACE and ORT mode).

When ADD function is activated, SB-2000 accumulates multiple deposits and also keeps running total in between all the modes and save them to memory. Each of these running totals will be added automatically and carry over to the next count when modes are changed. For example, a running total in MIX mode can be carried over to the running total in SORT mode. Total amount will be displayed all the time even when multiple counts are performed.

## 5-4 Changing Display Contents


The machine provides various information regarding counting results. Every time a count is completed, user can enter into different display screen by pressing [▶] direction key as illustrated below:






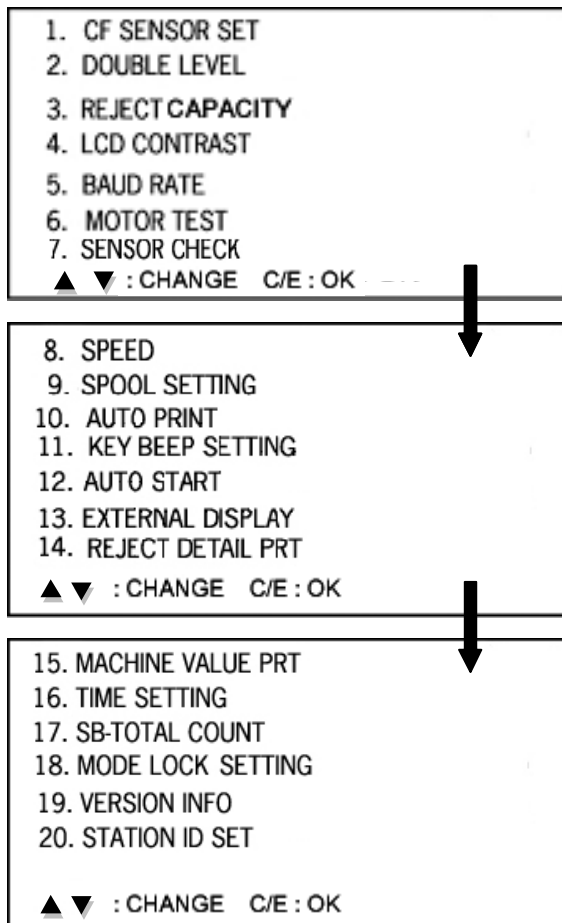
## 6. Set Function and Parameters

### 6-1 Main Function Menu

Please note that function and its parameters setting are password protected to prevent unauthorized access. Contact your distributor for password to unlock this function menu. Once it is unlocked, user can enter into the main menu and its parameters.

Once "FUNC"  key is pressed followed by password, main menu setup screen is displayed as below.

Use   Key to select a parameter and press  Key to confirm the selection. Press [EXIT] key to browse around or press [EXIT] key twice to escape from the main menu. The below screens display the selected parameter's setup screen.



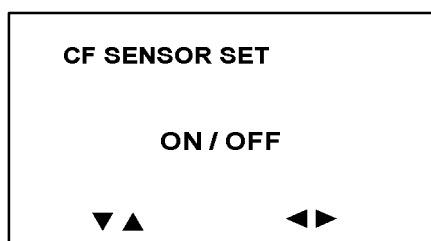
The factory default settings are described on the table below:

Function/Parameter		Default Value
Speed		About 720 NPM
LCD Contrast		High
Key Beep		Off
Auto Start		On
Pocket Capacity		Reject : 50 notes
Interface	Printer	Serial *)
	Baud	115K

\*) If the machine has optional SNP mode, default printer type is set to Parallel Port.

## 1. CF SENSOR SET

User or authorized personal can turn ON or OFF the Counterfeit detection feature installed with your SB-2000 from this menu item. As a standard feature, SB-2000 is equipped with Ultra-Violet and Magnetic Detection sensors which are embedded within a single CF feature. Advanced SB-2000 model can also be equipped with other means of counterfeit detection feature as optional feature.



Once user enters into the main menu, select 1. CF SENSOR SET using [▼] [▲] key. Use [◀] [▶] to select ON / OFF. Once selection is made, press [EXIT] key to confirm the setting and [EXIT] key again to escape from the main menu.

## 2. DOUBLE LEVEL

Double level is used to set double detection for banknotes. If SB-2000 stops for doubles frequently, user can lower the value to prevent double errors. Please change the value with small increment cautiously. Do not attempt to perform this adjustment without consulting with your sales representative or an SB-2000 authorized service technician.

<b>DOUBLE VALUE</b>	
<b>VALUE: 45</b>	
▼ ▲	◀ ▶

Once user enters into the main [FUNC] menu, select 2. DOUBLE LEVEL. Use [◀] [▶] key to change the value. Press [EXIT] key to confirm the value and [EXIT] key again to escape from this menu and return to main screen.

## 3. REJECT NUMBER

The capacity of the Reject Pocket can be change using this sub-menu. If users normally process good quality notes, then the capacity of the Reject Pocket should be set maximum 70 notes; otherwise the value should be set to minimum 50 notes for the Reject Pocket. To set to a value, first enter into the 3. REJECT NUMBER sub-menu using [▲] [▼] and move to a level using [▶] [◀] key. Once selection is made, Press [EXIT] key to confirm the setting and [EXIT] key again to escape from this menu and return to main screen.

<b>REJECT CAPACITY</b>	
<b>50 &gt; 60 &gt; 70 &gt; 80</b>	
▼ ▲	◀ ▶

## 4. LCD CONTRAST

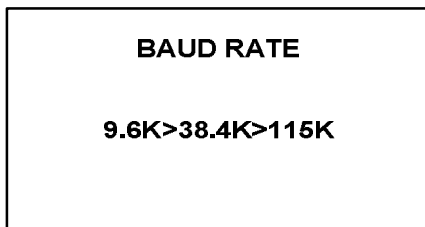
This menu decides the contrast of the LCD display screen. To change the LCD contrast, first select 4. LCD CONTRAST menu using [▲] [▼] and move to a level (High, Medium and Low) using [▶] [◀] key. Factory default setting is close to High. Once selection is made, Press [EXIT] key to confirm the setting and [EXIT] key again to escape from this menu and return to main screen.



## 5. BAUD RATE

User can set up baud rate for communication as below. Factory default is 115Kpbs.

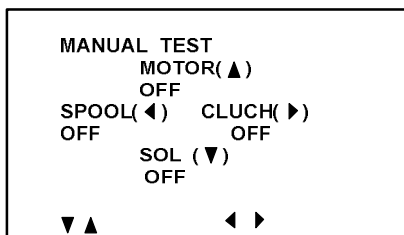
9.6Kbps > 38.4Kbps > 115Kbps



To change communication baud rate, first enter into the 5. BAUD RATE menu using [▲] [▼] and select the proper baud rate using [▶] [◀] key. Once selection is made, Press [EXIT] key to confirm the setting and [EXIT] key again to escape from this menu and return to main screen.

## 6. MOTOR TEST (Restricted for Service Professional)

Authorized SB-2000 Service Professional can check the status of the Main Motor, Stacker wheel and motor, Clutch and Solenoid using this menu option.



## 7. SENSOR CHECK (Restricted for Service Professional)

SENSOR	L	R
HOPPER SEN		OK
COUNTA SEN	OK	OK
COUNTB SEN	OK	OK
COUNTC SEN	OK	OK
COUNTD SEN	OK	OK
STAKER SEN		OK
REJECT SEN	OK	S:ST

Authorized SB-2000 Service Professional can check the status of all sensors (Hopper, counting, stacker and reject sensors) using this menu option.

## 8. SPEED

Counting speed of the SB-2000 is fixed from the factory and applies to all counting mode including optional Serial number printing function.

Mode	Factory Speed
COUNT	About 720 NPM
MXED / SINGL / FACE / ORENT	
SORT	
SNP	

## 9. SPOOL SETTING (Restricted for Service Technician)

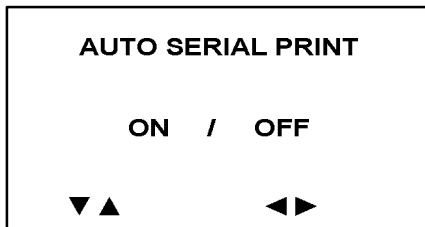
This menu function is reserved for service technician. Users are not recommended to enter into this sub-menu. This function is to set the speed of SPOOL motor.

<b>SPOOL MOTOR SPEED</b>
<b>LOW&gt;MID&gt;HIGH</b>
▼ ▲ ◀ ▶

To change Spool Motor Setting from Low / MID / HIGH, first enter into the 9. SPOOL SETTING menu using [▲] [▼] and select the proper speed using [▶] [◀] key. Once selection is made, Press [EXIT] key to confirm the setting and [EXIT] key to escape from this menu or [EXIT] key again to return to main menu.

## 10. AUTO PRINT

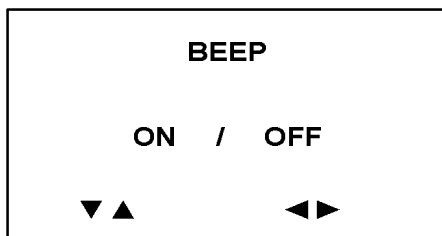
If this AUTO PRINT function is activated (ON), SB-2000 prints current total as soon as counting is completed and bills are removed from the Stacker. User can also set the SB-2000 to print (optional) serial number of banknotes automatically once counting is completed.



To set automatic serial number printing ON / OFF, first enter into the 10. AUTO PRINT menu using [▲] [▼] and select ON / OFF using [▶] [◀] key. Once selection is made, Press [EXIT] key to confirm the setting and [EXIT] key again to escape from this menu and return to main screen.

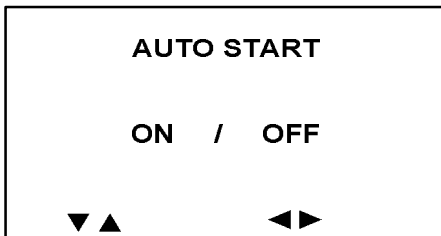
## 11. KEY BEEP SETTING

If Key Beep function is set to "ON", an audible beep tone will generate when a key is pressed, otherwise it will not be sound off. To turn Beep ON or OFF, first enter into the 11. KEY BEEP SETTING sub-menu using [▲] [▼] and select ON / OFF using [▶] [◀] key. Once selection is made, Press [EXIT] key to confirm the setting and [EXIT] key again to escape from this menu and return to main screen.



## 12. AUTO START

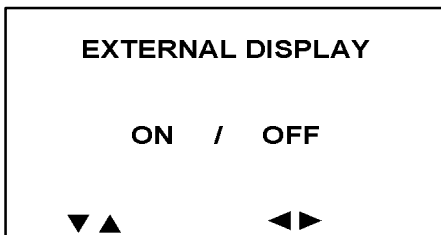
In Automatic mode, user can automatically starts the machine counting when machine detects a note on the hopper. Whereas in Manual mode, the machine only starts counting when a banknote is placed on the hopper and START / STOP key is pressed by user.



To turn Auto Start ON or OFF, first enter into the 12. AUTO START menu using [▲] [▼] and select ON / OFF using [▶] [◀] key. Once selection is made, Press [EXIT] key to confirm the setting and [EXIT] key again to escape from this menu and return to main screen.

## 13. EXTERNAL DISPLAY

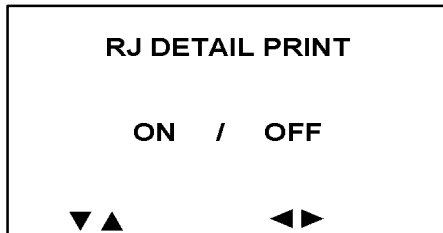
If External Customer Display was purchased along with SB-2000, user can connect the Customer Display at the rear of the machine. External Customer display shows the current counting results including quantity and value of banknotes.



To engage or disengage External Customer Display, first enter into the 13. EXTERNAL DISPLAY menu using [▲] [▼] and select ON / OFF using [▶] [◀] key. Once selection is made, Press [EXIT] key to confirm the setting and [EXIT] key again to escape from this menu and return to main screen.

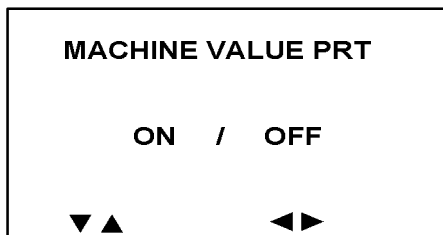
## 14. REJECT DETAIL PRINT

User can print a detail report of rejected notes using this function. If this function is turned ON, SB-2000 prints the detail report of the rejects banknotes automatically once counting is completed (if an external printer is connected).



## 15. MACHINE VALUE PRINT (for service technician only)

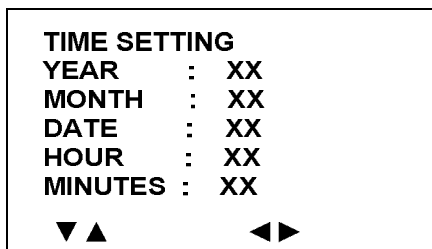
Trained users or authorized service technician of SB-2000 is able to print out information of factory set parameters and value. When this function is ON, SB-2000 prints this machine information automatically (if an external printer is connected).



To turn ON or OFF this function, first enter into the 15. MACHINE VALUE PRT menu using [▲] [▼] and select ON / OFF using [▶] [◀] key. Once selection is made, Press [EXIT] key to confirm the setting and [EXIT] key again to escape from this menu and return to main screen.

## 16. TIME SETTING

All SB-2000 machines usually ship from factory with time set for North America (Eastern Time Zone). However, if it is not set correctly or due to day-light savings, user can reset the year, months, date and time of the SB-2000.



To reset date and time for SB-2000, first enter into the 16. TIME SETTING menu using [▲] [▼] and set your date and time using [▶] [◀] [▲] [▼] key. Once selection is made, Press [EXIT] key to confirm the setting and [EXIT] key again to escape from this menu and return to main screen.

## 17. SB-TOTAL COUNT

Trained users and service technician are able to retrieve and view lifetime count of the machine using this function. This count report does not include count of reject banknotes. Even when SB-2000 is turned off, machine does not erase the machine count and automatically save into the memory.

<b>MACHINE TOTAL CNT</b>	
<b>XFFFF 1ST :</b>	<b>XXXXX</b>
<b>XFFFF 2ND:</b>	<b>0</b>
▼▲	◀▶

To retrieve lifetime count for the SB-2000, first enter into the 17. MACHINE TOTAL CNT menu using [▲] [▼] and LCD display screen will show the lifetime count result. After counting number reached maximum number (10 digits) on the first line, counting number moves to second line as 1, 2 etc with 1 increment represent **4,294,967,295** count. Press [EXIT] key again to escape from this menu and return to main screen.

## 18. MODE LOCK SETTING

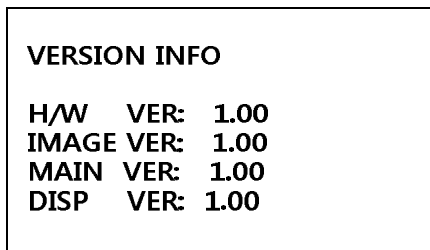
To prevent a mode from changing unintentionally, user can disable the MODE by setting MODE LOCK SETTING to ON. While this function is ON, the MODE key will be deactivated.

<b>MODE LOCK</b>	
<b>ON / OFF</b>	
▼▲	◀▶

To turn ON or OFF this function, first enter into the 18. MODE LOCK SETTING menu using [▲] [▼] and select ON / OFF using [▶] [◀] key. Once selection is made, Press [EXIT] key to confirm the setting and escape from this menu or press [EXIT] key again to return to main screen.

## 19. VERSION INFO

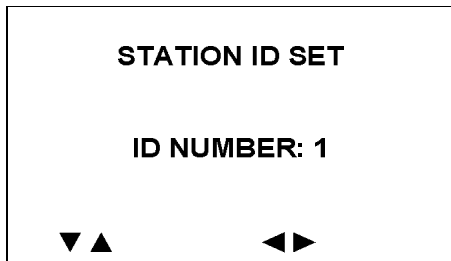
Trained users or service technician are able to view the machine software and hardware version using this menu. This is useful prior loading new software patch to SB-2000 or replacing hardware.



To retrieve software and hardware version for the SB-2000, first enter into the 19. VERSION INFO menu using [▲] [▼] and LCD display screen will list hardware and software version. Press [EXIT] key again to escape from this menu and return to main screen.

## 20. STATION ID SET

User can select each Station ID (1-255) from this menu and this station ID will appear on the print output.



To select Station ID, first enter into the 20. STATION ID SET menu using [▲] [▼] and select 1-255 using [▶] [◀] key. Once selection is made, Press [EXIT] key to confirm the setting and escape or [EXIT] key again to escape from this menu and return to main screen.



## **6-2 Engineer setup (Password Protected area)**

This menu is strictly restricted for users. Only authorized service professional of SB-2000 are able to enter into this menu to make adjustment of counterfeit detection settings and machine initialization set up. Please contact your master distributor for the password to enter into this menu and instructions for item 6-2-1 and 6-2-2 and 6-2-3.

<b>6-2-1</b>	<b>UV SENSOR SET</b>
<b>6-2-2</b>	<b>IR SENSOR SET (If equipped)</b>
<b>6-2-3</b>	<b>MG SENSOR SET</b>
<b>6-2-4</b>	<b>NOTE RESULT</b>
<b>6-2-5</b>	<b>MACHINE INITIALIZE</b>

## 7. How to Print Reports

SB-2000 can be connected to several serial dot matrix printers, such as Samsung SRP-275A, Citizen IDP 3550 etc. If Printer is purchased with SB-2000 and connected to the machine, users can print several types of counting reports as described below.

To Print a particular report, press  key to access to the main print menu and make your selection by using [▲] ▼] key. Once selection is completed, press  key to print that particular report you selected.

### 7-1 TOTAL PRINT

```
PRINT MENU
1. TOTAL PRINT
2. GRAND TOTAL PRINT
3. RJ DETAIL PRINT
4. FUNC VALUE PRINT

▼▲ : ITEM  ENTER : OK
```

This report will show current count. Report shows current total of counted banknotes by quantity and amount. After selecting 1.TOTAL PRINT, press [CE / ENTER] key to print. ***If AUTO PRINT function is activated (ON) from the menu (See 10. AUTO PRINT; page 30), SB-2000 prints current total as soon as a counting is completed and bills are removed from the Stacker.***

```
***** REPORT *****
Time : 04/01/2010, 15:49
Currency : USD
STATION: 1 Deposit No. : 2
*****
DENIM :    PCS    :  TOTAL
*****
$1      9        9
$5      3        15
$10     19       190
$20     13       260
$50     1        50
*****
TOTAL :   45    $   524
*****
```

## 7-2 GRAND TOTAL PRINT

This report will show current count. Report shows grand total of counted banknotes by quantity and amount. After selecting 2.GRAND TOTAL PRINT, press [CE / ENTER] key to print.

### PRINT MENU

1. TOTAL PRINT

2. GRAND TOTAL PRINT

3. RJ DETAIL PRINT

4. FUNC VALUE PRINT

▼ ▲ : ITEM    ENTER : OK

### \*\*\*\*\* GRAND TOTAL REPORT\*\*\*\*\*

Time : 04/01/2010, 15:41

Currency : USD

STATION: 1 Deposit No. : 1

DENIM :    PCS    :    TOTAL

\$1            2039            2039

\$5            241            2410

\$10           13            260

\$20           35            1750

\$50           17            1700

TOTAL :    2345       \$       8159

### 7-3 RJ DETAIL PRINT

This report will show detail reasons of all rejected banknotes. After selecting 3.RJ DETAIL PRINT, press [CE / ENTER] key to print. User can print a detail report of rejected notes using this function.

```
PRINT MENU
1. TOTAL PRINT
2. GRAND TOTAL PRINT
3. RJ DETAIL PRINT
4. FUNC VALUE PRINT

▼▲ : ITEM  ENTER : OK
```

```
-----
* SB-2000 Reject Detail Report
-----
DIMENSION ERROR      0
CHAIN                 0
HALF NOTE             0
CF-A  ERROR          0
CF-B  ERROR          0
CF-C  ERROR          0
CF-D  ERROR          0
CF-E  ERROR          0
CF-F  ERROR          0
CF-G  ERROR          0
CF-H  ERROR          0
DOUBLE ERROR         0
MISMATCH1            0
IMAGE ERROR          0
MISMATCH2            0
BATCH  FULL          0
REJECT FULL          0
NOTE ERROR           0

*****
Reject Total :      0
*****
```

## 7-4 FUNCTION VALUE PRINT

This report will show value of all sensors and useful for service technician. After selecting 4. SB-2000 VALUE PRINT, press [CE / ENTER] key to print.

### PRINT MENU

1. TOTAL PRINT

2. GRAND TOTAL PRINT

3. RJ DETAIL PRINT

4. FUNC VALUE PRINT

▼▲ : ITEM    ENTER : OK

-----  
\* SB-2000 MACHINE VALUE PRINT  
-----

#### 1.UV TOP SENSOR SET

UVT ON/OFF:ON

UVT FL:130

UVT RL:100

UVT TFL: 15

#### 2.UV BOT SENSOR SET

IR ON/OFF:ON

IRA : 50

IRS : 12

IRH : 12

#### 3.MG SENSOR SET

MG ON/OFF:ON

MG LEFT: 10

MG CENTER: 50

MG RIGHT: 10

#### 4.DOUBLE LEVEL

DOUBLE Value: 45

#### 5.REJECT CAPACITY

REJECT Number: 50

#### 6.LCD CONTRAST

LCD Contrast: 26

#### 7.BAUD RATE

BAUDRATE:115200bps

#### 11.SPEED SETTING

SPEED SETTING:960

#### 12.SPOOL SETTING

SPOOL SETTING:2 Level

#### 13.SERIAL PRINT

SN Print ON/OFF:OFF

#### 14.BUZZER

Buzzer ON/OFF:OFF

#### 15.AUTO START

Auto Start ON/OFF:ON

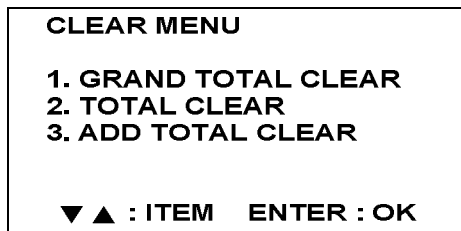
#### 16.EXTERNAL DISPLAY

EX Display ON/OFF:OFF

## 8. How to Clear Counting Results

**User can clear current counting result by simply pressing [CE / ENTER] key.**

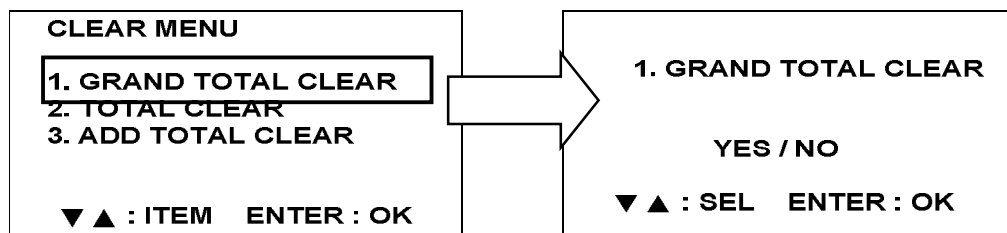
Trained users can also erase current counting results, grand total count etc from CLEAR MENU. Press [CLEAR] key to enter into the CLEAR MENU and the below window screen appears on the LCD display.



Select your desire report by using [▲] [▼] direction keys and [CE/ENTER] to confirm the selection.

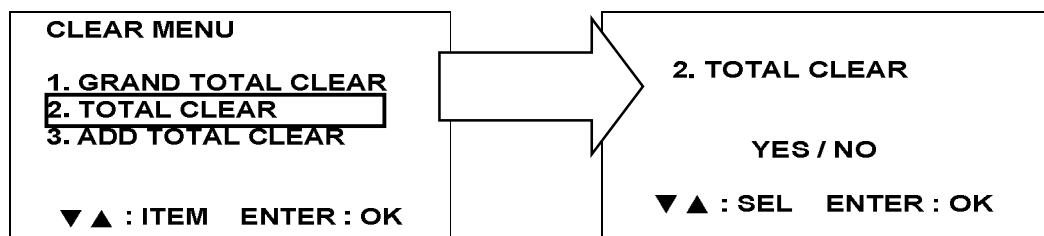
### 8-1 GRAND TOTAL CLEAR

- § To clear Grand Total saved in the memory, enter into 1. GRAND TOTAL CLEAR menu and press [CE / ENTER] to reach to a second screen where user can erase the Grand Total saved into the memory. Choose YES to erase and NO to escape followed by [CE / ENTER] key. To return to Main Menu, press [EXIT] key twice.



## 8-2 TOTAL CLEAR (CURRENT RESULT)

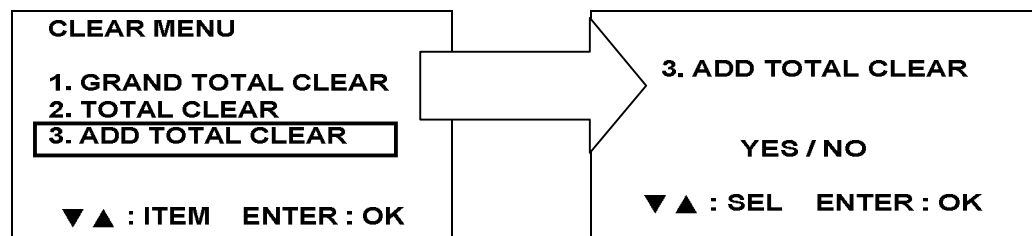
- § To clear current counting results, enter into 2. TOTAL CLEAR menu and press [CE / ENTER] to reach to a second screen where user can erase the current counting results. Choose YES to erase and NO to escape followed by [CE / ENTER] key. To return to Main Menu, press [EXIT] key twice.



- § Note that users can clear current counting result by pressing [CE /ENTER] key without going through the CLEAR menu.

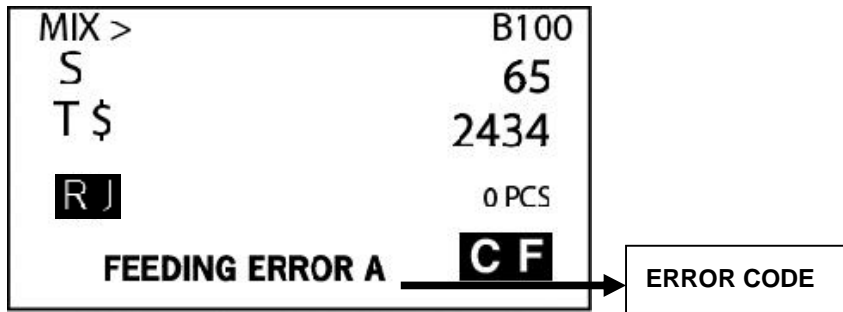
## 8-3 ADD TOTAL CLEAR

- § This menu is used to erase the immediate last counting result from the grand total saved in the memory (**only apply to when ADD function is being activated**).



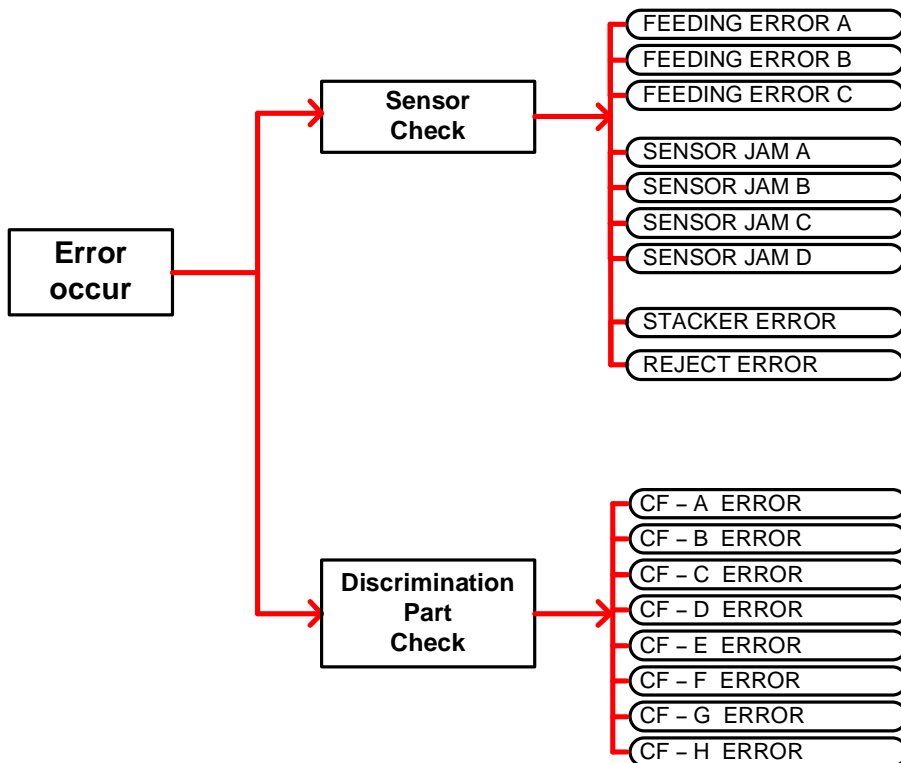
- § To clear current counting results during an accumulation (ADD) count, enter into 3. ADD TOTAL CLEAR menu and press [CE / ENTER] to reach to a second screen where user can erase the accumulated counting result. Choose YES to erase and NO to escape followed by [CE / ENTER] key. To return to Main Menu, press [EXIT] key twice.

## 9. Troubleshooting



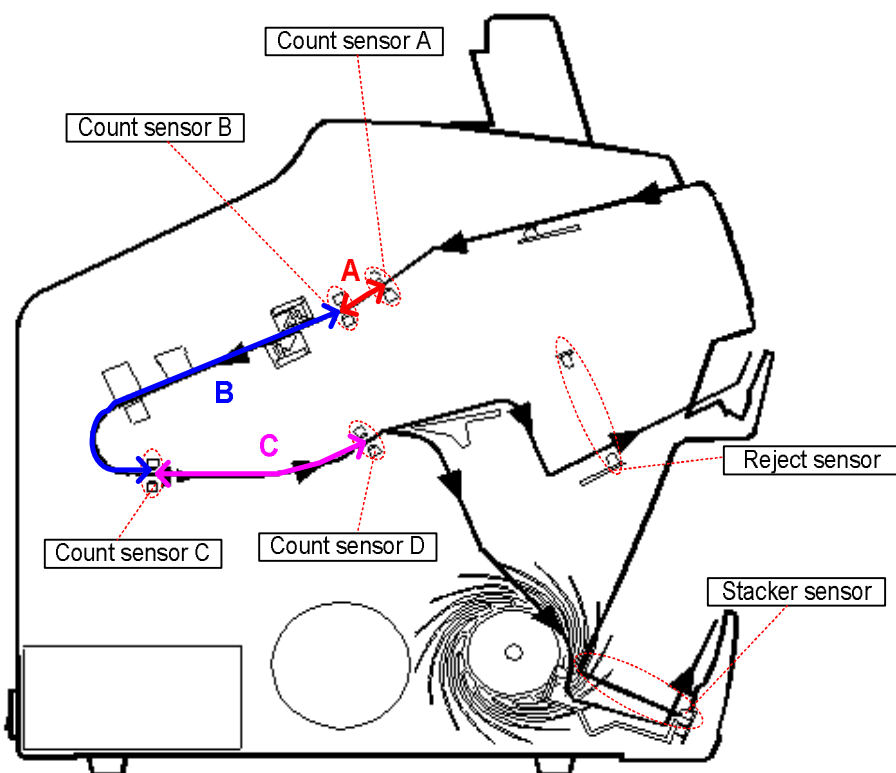
During counting, SB-2000 may halt due to certain error conditions. An error message will alert user of the condition of error. Please review the section 9.1 to solve the error conditions.

The below diagram summarize the different Error conditions during counting.



<Figure: Action map for Error indicated on Display>

- § In case of a machine malfunction or a stop, please look for the error message displays on the screen and follow the solutions / steps described under section 9.1.
- § In case of a counterfeit error, follow the solutions / steps described under section 9.1.
- § In case of a machine malfunction or error / jam, remove all banknotes from the hopper, stacker and from the rear and resume counting by placing banknotes on the hopper.



< Sensor's position >

### 9.1. Error caused by Sensor's breakdown and malfunction

No	Error Code	cause	solution
1	<b>FEEDING ERROR A</b>	Error caused by delivery delay in A part	<p>I. Please amend defective parts after check Roller around of Main motor or Roller at feeder.</p> <p>II. Please replace defective sensor after check condition of Count Sensor A and B</p>
2	<b>FEEDING ERROR B</b>	Error caused by delivery delay in B part	<p>I. Please amend defective part after check Discrimination Part Roller</p> <p>II. Please replace defective sensor after check condition Count Sensor B and C</p>
3	<b>FEEDING ERROR C</b>	Error caused by delivery delay in C part	<p>I. Please amend defective part after check Transfer plate Part Roller</p> <p>II. Please replace defective sensor after check condition of Count Sensor C and D</p>
4	<b>SENSOR JAM A</b>	Count Sensor A's jamming	<p>I. Count Sensor A clean</p> <p>II. Please replace defective sensor after check condition of Count Sensor A</p>
		Sensor breakdown	
5	<b>SENSOR JAM B</b>	Count Sensor B's jamming	<p>I. Count Sensor B clean</p> <p>II. Please replace defective sensor after check condition of Count Sensor B</p>
		Sensor breakdown	
6	<b>SENSOR JAM C</b>	Count Sensor C's jamming	<p>I. Count Sensor C clean</p> <p>II. Please replace defective sensor after check condition of Count sensor C</p>
		Sensor breakdown	
7	<b>SENSOR JAM D</b>	Count Sensor D's jamming	<p>I. Count Sensor D clean</p> <p>II. Please replace defective sensor after check condition of Count Sensor D</p>
		Sensor breakdown	
8	<b>STACKER ERROR</b>	Stacker Sensor's jamming	<p>I. Stacker Sensor clean</p> <p>II. Please replace defective sensor after</p>

		Sensor breakdown	check condition of Stacker Sensor
<b>9</b>	<b>REJECT ERROR</b>	Reject Sensor's jamming	<b>I.</b> Reject Sensor clean <b>II.</b> Please defective sensor after check condition of Reject sensor
		Sensor breakdown	

## 9.2 Error caused by Banknote Recognition Module

No	Error Code	cause	solution
10	<b>CF-A ERROR</b>	To show possibility of counterfeit on UV FL sensor	<b>I.</b> UV sensor clean <b>II.</b> Check UV Top sensor FL setting <b>III.</b> Replace defective sensor after check condition of UV sensor
11	<b>CF-B ERROR</b>	To show possibility of counterfeit on UV RL sensor	<b>I.</b> UV sensor clean <b>II.</b> Check UV Top sensor RL setting <b>III.</b> Replace defective sensor after check condition of UV sensor
12	<b>CF-C ERROR</b>	To show possibility of counterfeit on MG Center sensor	<b>I.</b> Brush roller ass'y clean <b>II.</b> Check MG Center setting <b>III.</b> Replace defective sensor after check condition of MG Center sensor
13	<b>CF-D ERROR</b>	To show possibility of counterfeit on MG Left, Right Sensor	<b>I.</b> Brush roller ass'y clean <b>II.</b> Check MG Left, Right setting <b>III.</b> Replace defective sensor after check condition of MG Left, Right sensor
14	<b>CF-E ERROR</b>	To show possibility of counterfeit on IR Sensor(IRA)	<b>I.</b> Adjustment of image sensor setup after check image <b>II.</b> IRA setting check
15	<b>CF-F ERROR</b>	To show possibility of counterfeit on IR Sensor(IRS)	<b>I.</b> Adjustment of transmit image sensor setup after check image <b>II.</b> IRS setting check
16	<b>CF-G ERROR</b>	To show possibility of counterfeit on IR Sensor(IRH)	<b>I.</b> Adjustment of transmit image sensor setup after check image <b>II.</b> IRH setting check
17	<b>CF-H ERROR</b>	To show possibility of counterfeit on IR Sensor (water mark detection)	<b>I.</b> Adjustment of transmit image sensor setup after check image

### 9.3 Error Codes for recognition error on the Display Screen

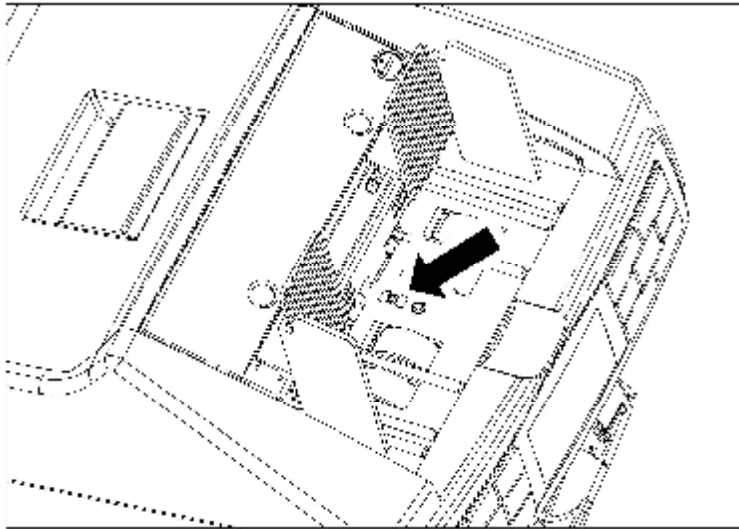
No	Error Code	cause	solution
18	MISMATCH	The banknote is different denomination from the first recorded banknote (SDC mode)	<ul style="list-style-type: none"> <li>I. Check the rejected banknote or information code.</li> <li>II. Resume counting by pressing [START/STOP] key.</li> </ul>
19	MISMATCH	The banknote is different orientation from the first recorded banknote (DIR à ORT mode)	
20	BATCH FULL	Current counting number (PCS) reached the pre-set batch number on the stacker	<ul style="list-style-type: none"> <li>I. Remove notes from stacker pocket</li> <li>II. Resume counting by pressing [START / STOP] key.</li> </ul>
21	REJECT FULL	Reject pocket reached the maximum banknotes	<ul style="list-style-type: none"> <li>I. Remove reject banknotes from the Reject Pocket</li> <li>II. Resume counting by pressing [START/STOP] key.</li> </ul>
22	A-BATCH ERROR	In case of user picking up banknote from stacker during counting	<ul style="list-style-type: none"> <li>I. Resume counting by pressing [START / STOP] key.</li> </ul>
23	IMAGE ERROR	Banknote is not recognized by the image sensor	<ul style="list-style-type: none"> <li>I. Check the banknote manually for genuine or suspect.</li> <li>II. If genuine, place the banknote on the input hopper and resume counting.</li> <li>III. If banknote is genuine, but image sensor is failed to recognize, then, contact your service professional.</li> </ul>

24	<b>DIMENSION ERROR</b>	Banknote is larger in size compare to genuine banknotes	<ul style="list-style-type: none"> <li>I. Check the banknote manually for genuine or suspect.</li> <li>II. If genuine, place the banknote on the input hopper and resume counting.</li> <li>III. If banknote is genuine, but image sensor is failed to recognize, then, contact your service professional.</li> </ul>
25	<b>HALF NOTE</b>	Banknote is equal to half of the size of genuine banknotes	<ul style="list-style-type: none"> <li>I. Remove the banknote from the stacker and discard.</li> <li>II. If genuine banknote in original size found to show this error, then, contact your service professional.</li> </ul>

## 10. Daily Maintenance Cleaning

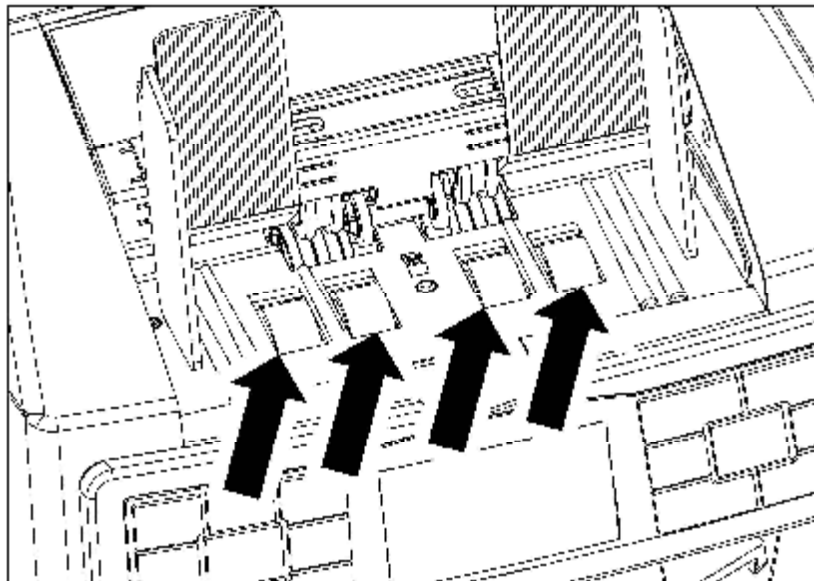
### 10-1 Cleaning of the sensor at the Hopper.

Clean the hopper sensor with an air dust cleaner or a cotton or silk cloth as shown on the below picture.



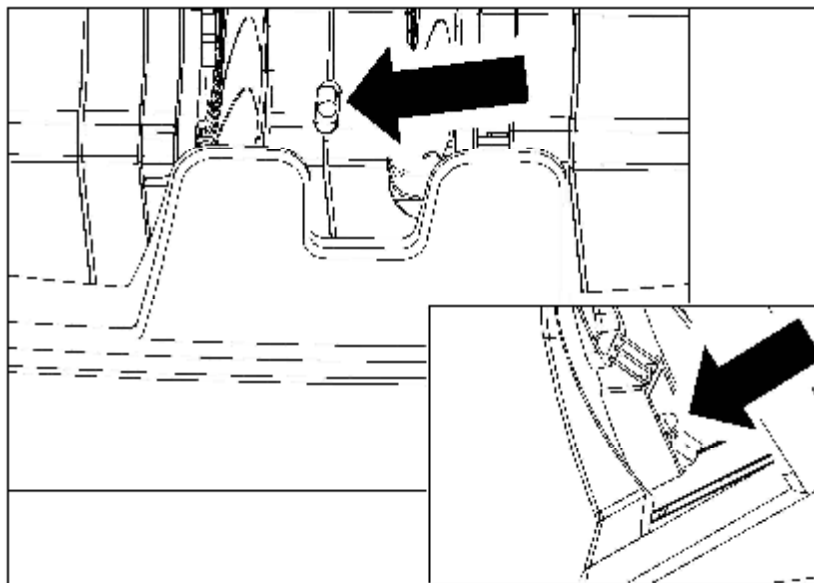
### 10-2 Cleaning of the roller at the hopper

Clean the feeding roller with a cotton or silk cloth as shown on the picture below.



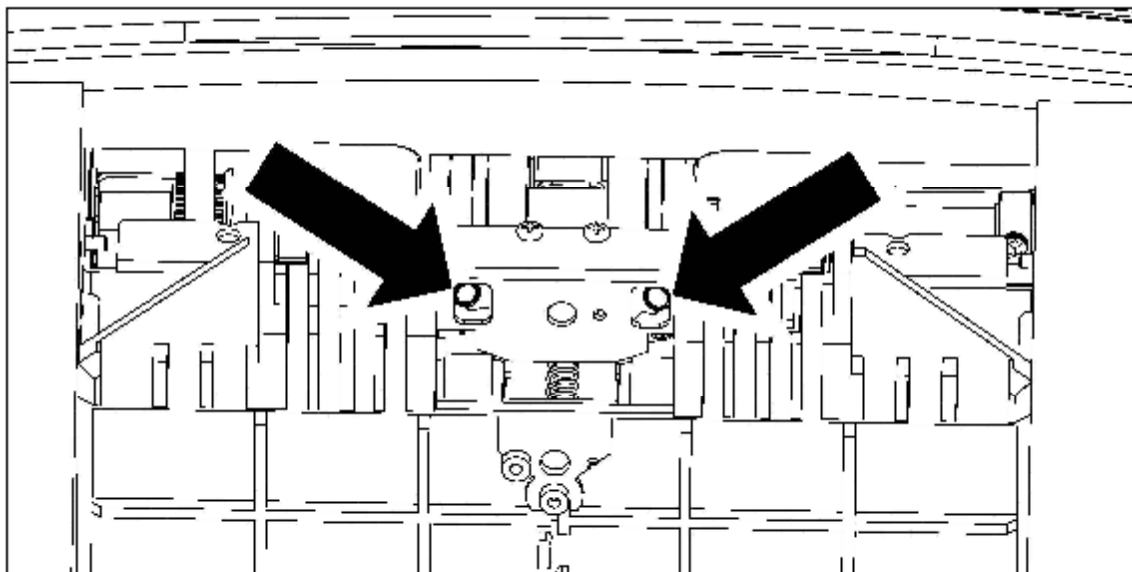
### 10-3 Cleaning of the sensor at the stacker

Clean the stacker sensor with a cotton or silk cloth or spray with an Air dust cleaner.



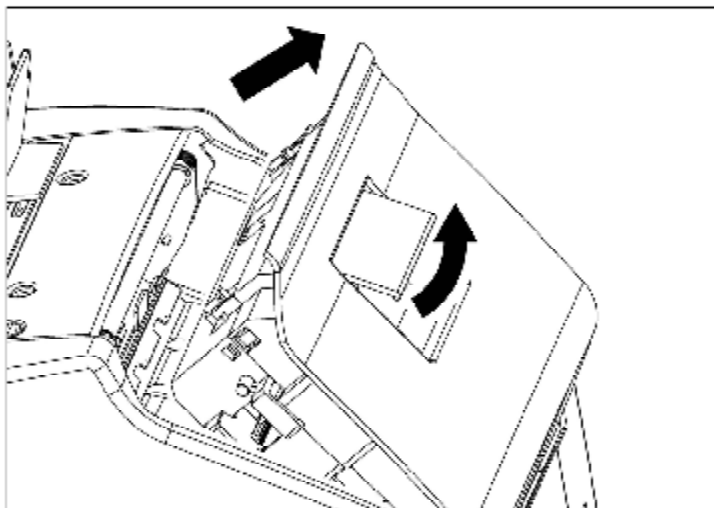
### 10-4 Cleaning of the sensor at the reject stacker

Clean / spray the reject pocket sensor with an Air dust cleaner when dust accumulates and sensor becomes less sensitive.

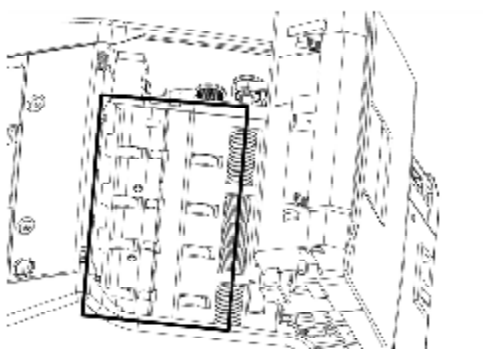
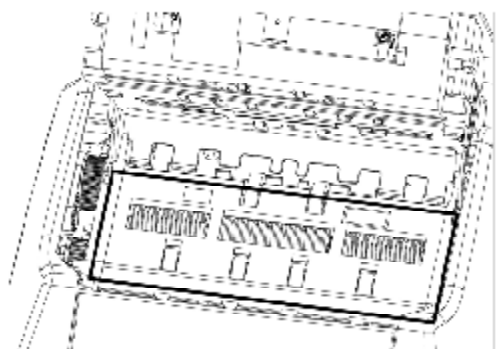
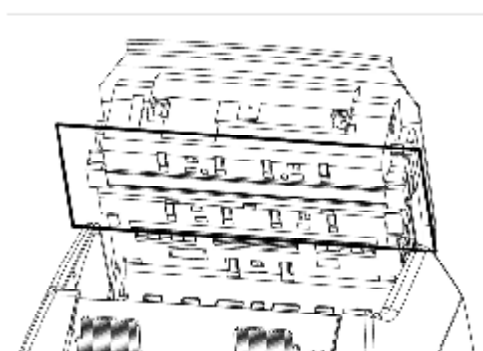
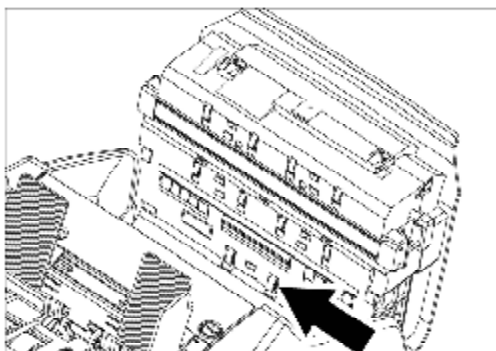


## 10-5 Cleaning of detection sensor and roller inside.

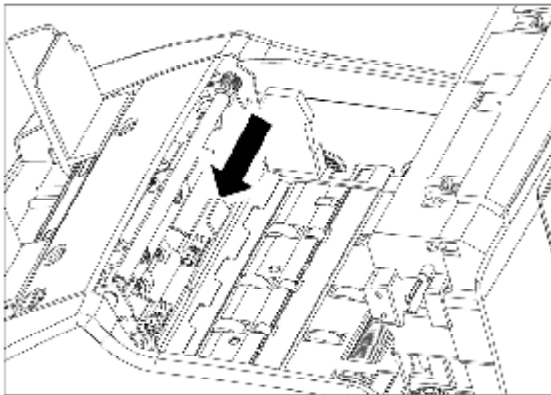
- § Pull the lever/handle to open the Top cover.



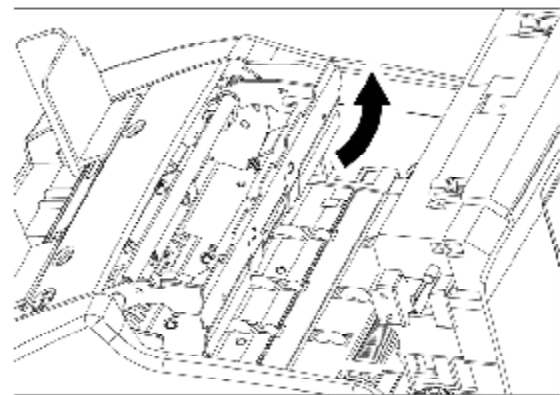
- § Clean the sensors and rollers as shown in the photo below with a cotton or silk cloth.



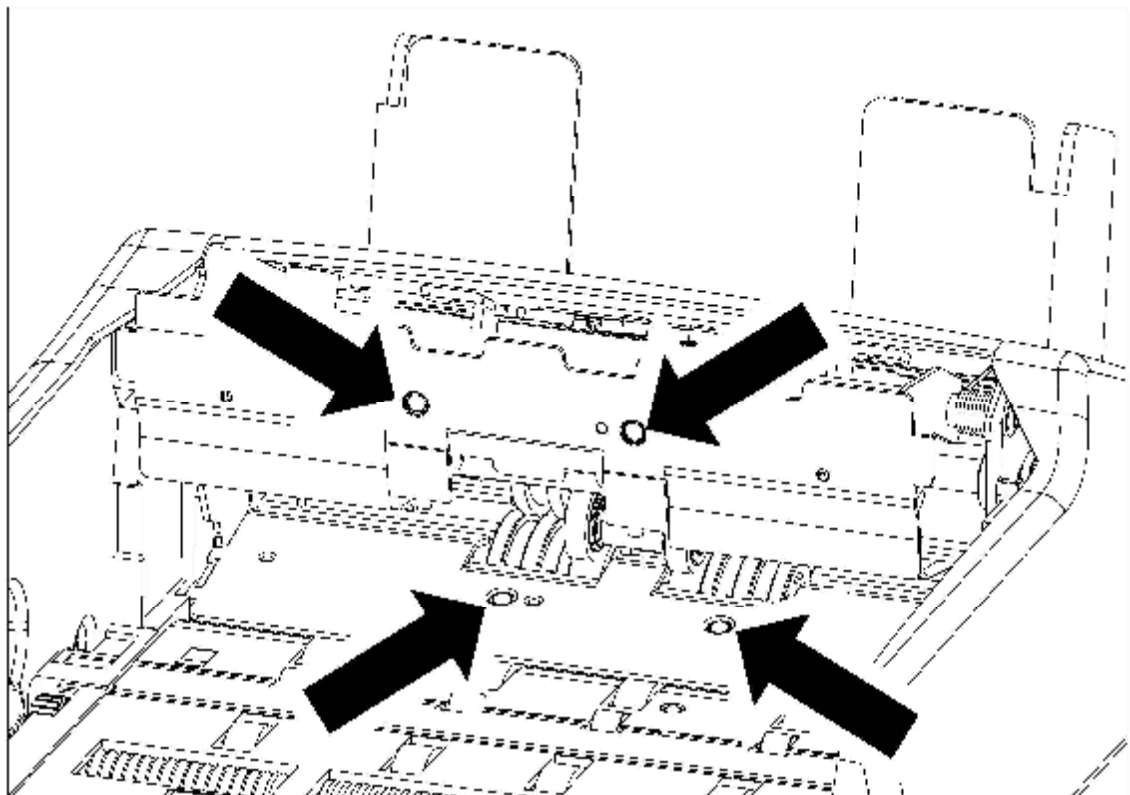
- § Open the guide by pulling a part on the edge.
- § Clean the sensor as shown in the photo below with a cotton or silk cloth.



Hold



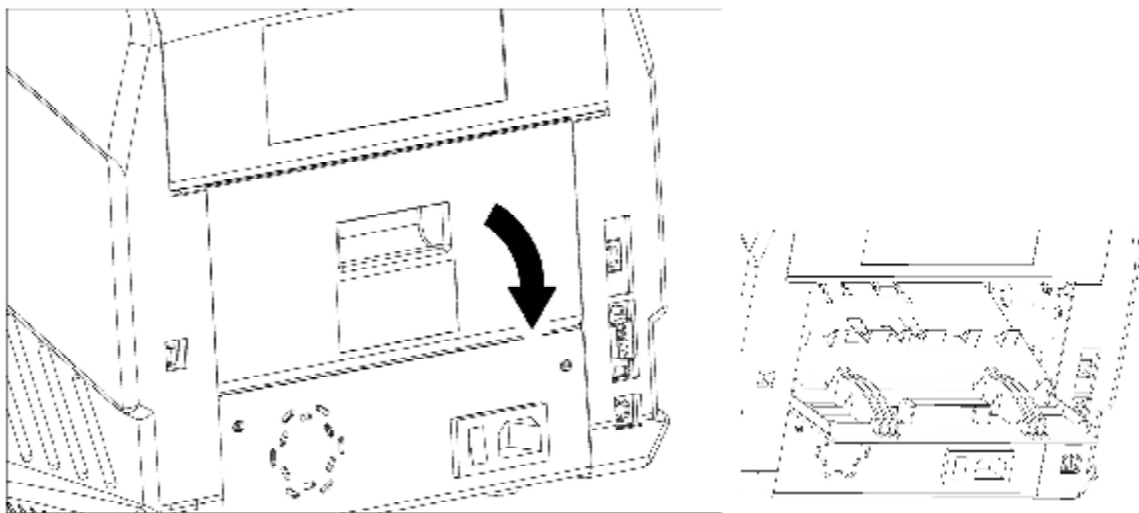
Pull up



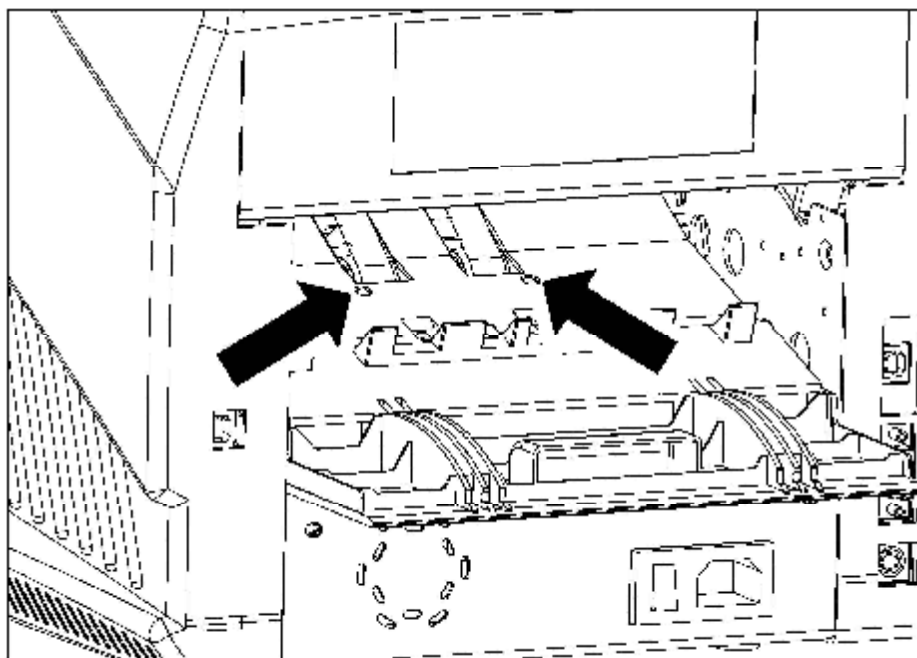
§ Close Top cover to push in.

## 10-6 Cleaning of the sensor inside Back cover.

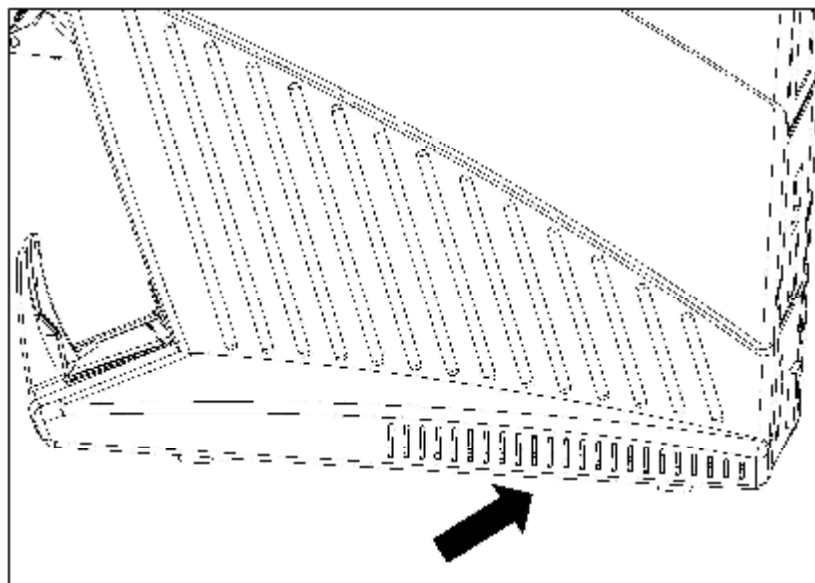
§ Pull the handle out to open the Back cover as below.



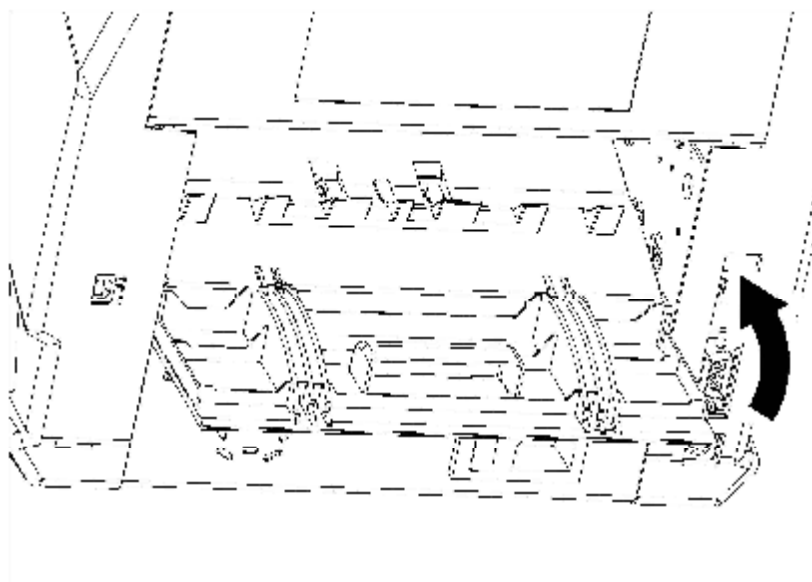
§ Clean the sensors as shown in the photo below with a cotton or silk cloth.



- § Using vacuum cleaner, remove the dust from holes under the side cover.



- § Close the Back cover as shown below.  
§ Push the door until it clicks.



## 11. Product Specification

Item	Unit	Specification
Size (W x D x H)	mm inch	321mm[W] x 355mm[D] x 334mm[H] 12.72"[W] x 14"[D] x 13"[H]
Weight	Kg / lbs	Approx. 14 kgs / 31 lbs
Hopper capacity	Notes	Max. 500
Stacker capacity	Notes	Max. 200
Reject pocket capacity	Notes	Max. 80
Display Type	Dot	128 x 64 Graphic LCD
Connectivity interfaces		RS232C Port, USB Port (s/w upgrade)
Currencies available	USD	1 (Available up to 3 currencies)
Banknote size range	mm	50 *100, 100 * 190mm
Banknote thickness range	mm	0.08 ~ 0.12
Counting Speed	Notes/min	About 720 NPM approx
Discrimination Mode		MIX/SDC/SORT/DIR/SNP(optional)/CNT DIR: FACE / ORT / F-ALL / O-ALL
Preset Batch Number		1 – 200
Counterfeit Detection		MG and UV. Optional: IR, MR, FL, CIS etc
Power Requirements		90-240VAC, 50~60Hz
Power Consumption	W	Standby: 25, Operation: 105
Operational requirements		0~50deg/30~85%RH (Non Condensing)

Notes:

- SB-2000 machine product specification can be changed without further notice.
- The contents of this operator's manual can also be changed without notice.

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